CONTROL

SYSTEMS · INSTRUMENTATION · DATA PROCESSING · AUTOMATION · MANAGEMENT

1968
VOLUME 12
NUMBERS 115 TO 126

Pages 1– 82, January
„ 83– 176, February
„ 177– 266, March
„ 267– 352, April
„ 353– 490, May
„ 491– 580, June
„ 581– 664, July
„ 665– 734, August
„ 735– 814, September
„ 815– 898, October
„ 899– 974, November
„ 975–1062, December

MORGAN-GRAMPIAN (PUBLISHERS) LIMITED
28 ESSEX STREET, STRAND, LONDON, W.C.2, ENGLAND

INDEX TO VOLUME TWELVE

TITLE INDEX

A

Acceleration transducer 1002
Accelerometer 23
Actuator control system, Pneumatic 692
Actuators
—, digital 554
—, hydraulic rotary 212
—, lever pneumatic 1002
—, linear 523
—, mechanical 692
—, pneumatic diaphragm 608
Adaptivity, System sensitivity and 959
Advanced Industrial Instrumentation Project 202
Airspeed calibrator, Digital 1002
Amplifiers
—, chopper-stabilized operational 848
—, crystal 766
—, differential operational 763
—, F.E.T. operational 616
—, galvanometer 1002
—, high-power dual-channel 764
—, low-noise 616
—, operational 24, 533, 611, 925
—, servo 25
—, signal-recovery 211
Analogue computers and system design 536
Analysis and synthesis of optimal control systems incorporating a digital computer 1031
Analytical instrumentation, Refinery 102
Anemometer, Laser 555
Annunciation 111
Arm, Mechanical 926
Assembly of rolling bearings, Automatic 143
Automation techniques in industry 563
Automobile, Induction-motor control for electric 471
Auxiliary control stations 116

B

Badge-card reader 215, 532
Batch controller 683
Batch counter 1002
B.C.D.-binary converter 291
B.C.D.-decimal decoders 760
Beama 289
B.H.R.A. 998
Binary-decimal averager 616
Biological assay in medical research 777
Biological problems of control, Technical and 1029
Blenders, Oil 836
Boilers, Control of large oil-fired 42
Books and Papers, see **Reviews, Book**
Brake/clutch units, Electromagnetic 852
Brake, Electromagnetic 208

C

Calculating printers 291
Cambridge, Control at 717
Cambridge multiple-access system 403
Card reader, Punched- 603
Cargo discharge, sorting and delivery 225
Cement industry 937, 939
Chemical processes, Direct digital control of 53
Chromatography 839
Clutches, Electromagnetic 767
Clutches for control systems 48
Cockenzie power station 598
Coefficient plane, Direct evaluation of sensitivity relationships using 560
Computer-aided design 202
Computer analysis of chromatographic data 839
Computer-based monitoring system 916
Computer-chromatography 204
Computer control 136, 141, 158, 204, 225, 334, 378, 379, 380, 518, 519, 635, 754, 835, 941, 998, 1031
Computer control, Alternative methods of 941
Computer control of power systems 64
Computer graphics 693, 861
Computer systems, Time-sharing 1002
Computers, analogue
—, A.D. 2–32 PB 123
—, Electronic Associates 231R 717
—, Electronic Associates Pace 717
—, System Computors mk-3 tutor 760
Computers and system design 536, 621, 723
Computers, digital
—, A.E.I. 4020 103
—, Computer Technology, Modular One 290
—, Digico Micro 16 108
—, Digital Equipment PDP-8/L 759
—, Digital Equipment PDP-9/L 759
—, E.-A. Arch 102 203
—, E.-A. Arch 2000 518
—, E.-A. 903 599
—, E.-A. 4130 717
—, E.E. System 4-40 295
—, Emidec 216 229
—, English Electric M2140 916
—, Ferranti Argus 400 519, 754
—, Ferranti Argus model-L 759
—, Foxboro PCP88 379
—, G.E.C.–A.E.I. 90/25 998
—, G.E.C.–A.E.I. Con/Pac 4040 998
—, Hewlett-Packard 2114A 759
—, Hewlett-Packard 9100A calculator 768
—, Hewlett-Packard 2115A 1002
—, Honeywell DDP-516 608
—, Honeywell H632 759
—, H.S. DCC-2 203
—, I.B.M. System-360, Model 25 296
—, I.C.L. 1908A 918
—, I.C.T. 1907 103
—, I.C.T. 1900-series 215
—, PDP-8 20
—, PDP-6 122
—, Univac 9400 208
—, Univac 418 III 683
Computers, hybrid 122, 243, 251, 717
Computers, Industrial measurement techniques for on-line (U.K.A.C. I.E.E.) 635
Conductivity analyser 843
Conductivity meter 392
Consistency measurement of non-Newtonian fluids 129
Controller/indicator 292
Controllers, Tuning pneumatic three-term 238
Core stores 296
Correction, Proportional 633
Counters, Digital 613
Counting, Statistics of 719
Crane control, Thyristor 520
Crankshaft balancer 534
Current transducer 387
Current transformer 925

D

D.D.C. 20, 23, 53, 203, 518, 941
Data and method sheets
Control in some idealized constant-temperature chambers by Z. J. Jelonek (Data sheet 41) 877
Design data to assist the plotting of root loci by S. E. Williamson. *Part I: Root loci of type-0 systems* 404
Part 2: Root loci of type-I systems 556
Part 3: Root loci of type-II and type-III systems (Data sheet 40) 645
Synthesis of third-order type-I systems by T. Konwerski (Data sheet 39) 316
Data displays 763, 768, 844, 861, 952
Data displays, C.R.T. 612
Data logger 534
Data logger, Tank 527
Data recorder, Production 691
Data store 852
Data terminals 27
Data-transmission tester 208
Decelerating and stopping equipment for cold-rolling reversing mills 707, 797
Decoder, B.C.D. 766
Density measurement, Liquid 711
Digital computer trainer 25
Digital computers and system design 621, 723
Digital control of high-speed elevators 775
Direct digital control—see also D.D.C.
Displacement meter 25
Displacement transducer 613
Displacement transducers, Linear 1002
Distillation-column dynamics, Determination of on-line 398
Dye-cycle controller 839
Dynamic programming successive-approximations technique 1050
Dynamometer 208

E

Eddy currents in terms of feedback-system parameters 793
Electrochemical cells 331
Electropneumatic transducer 51
Encoder, Optical 528
English Electric merger, G.E.C.– 832
English Electric, Plessey bid for 756
Esso, Fawley 379

F

Fan-speed controller 691
Feedforward control 218
Ferrous materials tester 291
Fibre optics 684
Field control of motors with constant-current armature supply 35
Flaw detector, Ultrasonic 1002
Flood-warning system 921
Flow detectors, Capacitive 764
Flowmeter calibration with soap films 232
Flowmetering 21
Flowmeters, Digital mass— 1002
—, Turbine 299
Flow regulation, Fuel- 330
Flow regulator, Air- 531
Flow-velocity measurement 527
Flue-gas sampler 292
Fluidics 24, 112, 128, 203, 296, 379, 531, 612, 614, 692, 767, 782, 847, 998, 1002
Force measurements, Piezo-electric balance for 800
Frequency-domain stability analysis for non-linear feedback systems 336
Frequency meter, Digital 391, 687

G

Gain and phase measurement 611
Galvanometers 615
Gas density meter 839
Gas detector 684
Gauging, Automatic 687
G.E.C.–A.E.I. Automation Ltd 383
G.E.C.–English Electric merger 832
Geiger-Müller counter 562
Glass switch, Solid-state 711
Governor for gas turbine, Optimum relay 322
Governor, Hydraulic 611
Gyrators 618

H

Hall effect, I.C. switch based on 1044
Hardness tester 684
Height gauge 105
Hill-climbing servo-mechanism 770
Holography 1041
Hybrid computation, Sequential-mode control system for 243
Hybrid computing link in time-shared environment 122, 251
Hydraulic mine-roof support 203
Hydraulic motor 296
Hydraulic servo-mechanism 696
Hydraulic tester, Portable 1002

Hydraulics 23
Hydro-thermal power systems, Optimum control of 327

I

I.C. modules 25
I.C.I. Central Instrument Research Laboratory 519
I.C.L. (International Computers Ltd) 680
Ideas applied
Automatic process control: proportional correction 633
Changing the reflectivity of solids 712
Consistency measurement of non-Newtonian fluids 129
Digital integrating milliammeter 792
Digital capacitive tide-level detector 882
Electronically controlled motor-car transmission system 51
Electropneumatic transducer uses a floating armature 51
Flowmeter calibration using the soap-film method 232
Fluidized-bed electrode for electrochemical cells 331
High-capacity reed switch 231
'Hi-syn' synchro, a low-cost feedback element for position servo-mechanisms 50
I.C. switch based on Hall effect 1044
Laser anemometer for turbulent velocity measurement 555
Liquid density measurement 711
Liquid-level transmitter 632
Magnetic measurement of distance 712
Magnetic non-mechanical d.c. ammeter 470
Novel relief valve 554
Numerical control of a co-ordinate table using fluidics 128
On-stream leak detector 791
Optical data store 631
Paper transistors 953
Pneumatic positioning device 554
Position control using a linear induction motor 791
Positional control without carrier voltage or error compensation 882
Pressure-relief device with rapid response 885
Remote-reading compass uses a position-sensitive photocell 230
Resolver-actuated synchronous switching 130
Servo-system for c.r.t. light-spot positioning by D. N. Hill and B. J. Steptoe 952
Simplified heat-sink assembly 953
Solid-state glass switch 711
Thermal-survey equipment 469
Two-stage fuel-flow regulation reduces explosion risk 330
Ultra-high-speed recorder based on a laser 330
Variable-focus lenses 469
Wave-height analysis 230
I.E.A. Exhibition 435
Identification, System 714, 717, 931, 959, 1016, 1026, 1031
I.E.E. Control and Automation Division 915
I.E.E.E. 713
I.E.E.–I.E.R.E. Automation symposium (Paisley) 563
I.E.E.T.E. 517
I.E.R.E. 379
Ifac (Budapest)—Pulse-rate and pulse-number signals in automatic control 627
Ifac symposium (Dubrovnik)—System sensitivity and adaptivity 959
Ifac symposium (Dusseldorf)—Multivariable control systems 1026
Ifac symposium (Vienna)—Automatic control in space 408
Ifac symposium (Yerevan)—Technical and biological problems of control 1029
Imperial College, Control in 634
Infra-red camera 115
Infra-red detectors 216
Integrators 840
International Computers Ltd 383
International Computers Ltd (I.C.L.) 680
Inspection machine 684
Inspection machine, Three-axis 111
Inst. M.C.—Ministry of Technology symposium (Paisley): industrial fluidics 782
I.S.C., Avonmouth 518

J

J.A.C.C. 886

K

Kent, George 20, 383
Keyboard switch 26

L

Laser anemometer 555
Laser interferometer 156
Laser recorder 330
Leak detection at Dounreay 102
Leak detector 24, 115, 524
Leak detector, On-stream 791
Length-measuring device 614
Lenses. Variable-focus 469
Letters to the editor, *Writers of*
Creighton, P. V. 562
Eaton, L. 46
Girling, B. 334
Glaze, S. G., and J. B. Seymour 334
Peterson, I. D. 415
Seymour, J. B. (*see* Glaze)
Shearer, J. L. and R. G. Leonard 334
Taylor, Denis 415, 562
Taylor, K. H. 561
Thomesen, C. H. W. 561
Ward, A. J. 334
Webb, C. R. 46
Yeomans, K. A. 1048
Level control, Capacitive 768
Level controller 604
Level controllers, Liquid 27
Level detector, Digital capacitive tide- 882
Level gauge, Liquid 691
Level gauging, Digital tank- 867
Level indicator, Liquid- 524
Level switches 392
Level switch, liquid 108
Level transmitter, Liquid- 632
Liapunov functions, Generation of 1050
Liapunov theory 545
Lift control 775, 1048
Light-spot positioning 952
Linear induction motor, Position control using a 791
Linear systems, Simplification of large 418
Liquid-impurity detector 112
Logic modules 613
Longannet mine complex 754
Look at America 62, 156, 336, 471, 713, 800, 886, 1050
Look at the Continent 64, 327, 714, 775, 1047
Looking ahead 2, 84, 178, 268, 354, 492, 582, 666, 736, 816, 900, 976

M

Machine tools 720
MacRobert Award 998
Magnetic non-mechanical d.c. ammeter 470
Magnetometer 688
Marconi-Elliott Microelectronics Ltd 756
Marine Diesel performance monitor 1002
Materials tester 115
Mechanisms, Electromechanical control of 37
Memories, Magnetic core 212
Memory cell, Monolithic 106
Memory disk 852
Memory stacks, Ferrite 763
Message switching 754
Microelectronics 112
Milliammeter, Digital integrating 792
Ministry of Technology 202
Moisture gauge, Infra-red 605
Moisture measurement, Microwave instruments for 20
Moisture meter 687
Motor-car transmission 51
Motor control 35, 147, 416, 471, 533, 604, 605, 614, 691, 702, 864, 1023, 1037
Motor gear-box 926, 1002
Motor, Geared 688
Motor-overload unit 1002
Motors and tachogenerators, 'Pancake' d.c. 691
Motors, Bi-directional 387
Motors, Control of double-stator squirrel-cage 416
Motors, D.C. stepping 687, 688
Motors for low-speed applications, Doubly fed 147
Motor, Synchronous 212
Motor, Transformer commutation for d.c. thyristor-bridge 1023
Multimeter, Electronic 1002
Multiplier, Analogue 104
Multivariable control systems 1026

N

National Physical Laboratory 288
New 20, 102, 202, 288, 378, 518, 598, 680, 754, 832, 915, 998
New hardware and software 22, 104, 208, 290, 384, 520, 603, 683, 759, 839, 918, 1002
N.P.L. 680
Nucleonic counter systems, Dead-time correction in 862
Numerical control 202, 299, 604, 608, 688, 843, 848
Numerical control of co-ordinate table using fluidics 128
Nyquist plotter 767

O

Optical character recognition 680, 847, 874, 1047
Optical data store 631
Optimal control 1031
Opto-electronic image detector 524
Oscilloscope 26
Osmometer, Automatic 391
Oven controller 25
Oxygen meter 1002

P

Page-printer, Automatic 918
Paper-stock consistency control 304
Paper-tape punch, Low-speed 851
Parameter estimation, Process 931
Particle-size analyser 604
Pattern recognition 874
pH 304, 388
Phase-failure units 22
Phase-sensitive detector 212
Phototransistor 24
Photo-voltaic cells, Selenium 764
Pick-off 47, 127, 224
Piezo-electric balance for force measurements 800
Piezo-electric components 688
Plant modelling from p.r.b.s. experiments 856, 947
Plessey bid for English Electric 756
Plotters, Digital incremental 524, 918
Pneumatic three-term controllers, Tuning 238
Position control 882
Position control using a linear induction motor 791
Positioning cylinders, Pneumatic 605
Positioning, Servo-system for c.r.t. light-spot 952
Position measurement 712
Port of London Authority 225
Potentiometers, Motor- 925
Power systems 327
Power systems, Computer control of 64
P.R.B.S. 1016
P.R.B.S. experiments, Plant modelling from 856, 947
Pressure and depth indicators 299
Pressure-balance transmitter 391
Pressure sensors 111
Pressure gauges 211
Pressure gauges, Differential- 528
Pressure indicator, Digital 692
Pressure indicator, Low- 840
Pressure/load indicator 693
Pressure, Pneumatic indicating controller for 532
Pressure regulator, Differential- 921
Pressure relief 885
Pressure switch 115
Pressure switches, Differential- 299, 387, 840
Pressure transducers 295, 603, 637, 764
Pressure transducer (transistor) 531
Pressure transmitters 844
Pressure/vacuum meter 684
Printed-character recognition 1047
Printer, Digital 918
Printer, Line 693
Process controllers 108, 523
Process parameter estimation 931
Processor interface 1002
Process simulator 292
Programmer, Matrix board 766
Programmer/timer 106
Proximity switch 105
Pseudo-random binary sequences—*see* p.r.b.s.
Pulse generator 1002
Pulse generator, Programmable 527
Pulse-rate and pulse-number signals in automatic control (Ifac, Budapest) 627
Pump, Metering 844
Pumps, Peristaltic 112
Punched-tape comparator 299
Punched-to-magnetic tape converter 1002

R

Rank Precision Industries Ltd 756, 917
Read-out, Machine digital 692
Recorders
—, laser 330
—, miniature 307, 561
—, multi-channel event 392
—, multichannel oscillograph 1002
—, temperature/humidity 391
—, twin-channel chart 107
—, u.v. 843
—, *xy-yt* 1002
Redox-current converter 111
Reed switch 231
Reflective phenomenon, Electro- 712
Regulator, Precision 922
Relays
—, bistable 614
—, bistable reed 766
—, plug-in 1002
—, pneumatic 611
—, resonant reed 766
Remote compass uses position-sensitive photocell 230
Remote supervision 103
Resistance thermometer bridge 392
Resolvers, Inductive 926
Reviews, Book—by authors' names
Andree, Richard V. *Computer programming and related mathematics* 28
Barnes, Colin I. *Computer applications* 395
Bauer, C. R., Peluso, A. P. *and* Worley, W. S. S. *Titran/360 self instructional manual and text* 28
Best, G.C. *and* Hooton, I. N. *Mean rate analysis with the PDP8 computer—A.E.R.E. report No R5425* 28

Chestnut, Harold. *Systems engineering methods* 301
Cluley, John C. *Electronic computers* 302
Cox, N. S. M. *and* Grose, M. W. *Organization and handling of bibliographic records by computer* 302
Dorf, Richard C. *Modern control systems* 119
Duffin, R. J.,Peterson, E. L. *and* Zener, C. M. *Geometric programming* 120
Dummer, G. W. A. *Advanced electronic techniques—proceedings of the second Oxford electronics lecture course* 120
Fawcett, J. R. *Hydraulic circuits and control systems* 119
Fishlock, David. *The new materials* 396
Franks, R. G. E. *Mathematical modelling in chemical engineering* 28
Grose, M. W. (*see* Cox)
Hass, A. *Basic industrial electronics* 395
Healey, Martin. *Principles of automatic control* 119
Hooton, I. N. (*see* Best)
Leondes, C. T. *Advances in control systems. Theory and applications. Vol. 5* 301
Likert, R. *The human organisation—its management and value* 617
Lindsay, P. A. *Introduction to quantum mechanics for electrical engineers* 120
Miller, Ernest C. *Marketing planning. Approaches of selected companies* 120
Mundel, M. E. *A conceptual framework for management sciences* 396
Myers, Charles A. *The impact of computers on management* 28
Peluso, A. P. (*see* Bauer)
Peterson, E. L. (*see* Duffin)
Peterson, G. R. *Basic analogue computation* 302
Porter, Brian. *Stability criteria for linear dynamical systems* 301
Ralston, A. *and* Wilf, H. S. *Mathematical methods for digital computers* 120
Rogers, F. E. *Topology and matrices in the solution of networks* 31
Saxon, J. A. *and* Steyer, W. W. *Basic principles of data processing* 31
Schmitt, E. *Elektronische schalter und kippstufen mit transistoren* 301
Schulte, D. *Kombinatorische und sequentielle netzwerke* 395
Shinskey, F. G. *Process control systems* 119
Steyer, W. W. (*see* Saxon)
Tou, Julius T. *Computer and information sciences—II* 302
Walker, B. S. *Introduction to computer engineering* 395
Whitfield, D. *Human factors problems in changing industrial systems. A.P. Note 4* 120
Wilf, H. S. (*see* Ralston)
Wolberg, John R. *Prediction analysis* 301
Worley, W. S. S. (*see* Bauer)
Zener, C. M. (*see* Duffin)

Reviews, Book—by titles
A conceptual framework for management sciences by M. E. Mundel 396
Advanced electronic techniques—proceedings of the second Oxford electronics lecture course by G. W. A. Dummer 120
Advances in control systems. Theory and applications. Vol. 5. Edited by C. T. Leondes 301
Basic analogue computation by G. R. Peterson 302
Basic industrial electronics by A. Hass 395
Basic principles of data processing by J. A. Saxon and W. W. Steyer 31
Better use of labour in the firm 301
Computer aided production control 119
Computer and information sciences—II edited by Julius T. Tou 302
Computer applications by Colin I. Barnes 395
Computer programming and related mathematics by Richard V. Andree 28
Electronic computers by John C. Cluley 302
Elektronische schalter und kippstufen mit transistoren by E. Schmitt 301
Geometric programming by R. J. Duffin, E. L. Peterson *and* C. M. Zener 120
Human factors problems in changing industrial systems. A.P. Note 4 by D. Whitfield 120
Hydraulic circuits and control systems by J. R. Fawcett 119
Instruments, electronics and automation purchasing directory 1968 616
International conference on automation, full employment and a balanced economy, Rome, Italy, 1967 617
Introduction to computer engineering by B. S. Walker 395
Introduction to quantum mechanics for electrical engineers by P. A. Lindsay 120
Kombinatorische und sequentielle netzwerke by D. Schulte 395
Marketing planning. Approaches of selected companies by Ernest C. Miller 120
Mathematical methods for digital computers by A. Ralston *and* H. S. Wilf 120
Mathematical modelling in chemical engineering by R. G. E. Franks 28
Mean rate analysis with the PDP8 computer —A.E.R.E. report No. R5425 by G. C. Best *and* I. N. Hooton 28
Modern control systems by Richard C. Dorf 119
Organization for overseas marketing—export handbook No. 3 395
Organization and handling of bibliographic records by computer, edited by N. S. M. Cox *and* M. W. Grose 302
Prediction analysis by John R. Wolberg 301
Principles of automatic control by Martin Healey 119
Process control systems by F. G. Shinskey 119
Report of industrial training act symposium 119
75 years Brown Boveri 120
Stability criteria for linear dynamical systems by Brian Porter 301
Staff titles and job descriptions in commercial data processing 395
Systems engineering methods by Harold Chestnut 301
The human organisation—its management and value by R. Likert 617
The impact of computers on management by Charles A. Myers 28
The industrial training yearbook 1967–1968 301
The new materials by David Fishlock 396
Titran/360 self instructional manual and text by C. R. Bauer, A. P. Peluso *and* W. S. S. Worley 28
Topology and matrices in the solution of networks by F. E. Rogers 31
Root loci 44, 316, 404, 556, 645, 870, 954
Root loci, Design data to assist plotting of
type-O systems 404
type-I systems 556
types II and III systems 645
Root locus of a second-order system 44
Root locus, Practical process control using 870, 954
Rotary pulse generators 295

S

Sample-changer, Automatic 843
Scanner/programmer 212
Scanning switch 116
Semiconductor curve-tracer 388
Sensitivity and adaptivity, System 959
Sequence controller 115
Servo-drive for Pitot, Self-balancing 312
Servo-mechanism, Impedance measurements of 696
Servo-mechanism, Three-phase induction motor in a 'bang-bang' 702
Servo-mechanisms and components 25, 50, 105 107, 130, 215, 216, 292, 296, 312, 541, 612, 614, 696, 702, 770, 792, 952, 1037
Servo-system with torque feedback, D.C. 1037
Single-term control of first and second-order processes with dead time 136
Sira 20
Smoke monitor 212
Solar cells, Blue-sensitive silicon 925
Space, Automatic control in 408
Spectrophotometer 107, 300, 615
Spectrum analyser 768
Speed meter 767
Speed, Transducer, rotary 692
State variables in sampled-data systems 57, 152, 248, 332
Statistical communication theory, Control engineering applications of 132, 246
Statistical identification methods 233
Steelworks instrumentation in the U.S.A. 67
Stepping modules 300
Stepping-motor performance, Improving 541, 648
Stopping equipment for cold-rolling reversing mills, Decelerating and 707, 797
Store, Ferrite 1002
Store, Magnetic typewriter 533
Store (pulse-to-analogue) 687
Strain gauge, Dummy 531
Strain-gauge equipment 851
Strain-gauge meter 615
Strain gauges 27, 300
Strain-gauge system 111
Strain-gauge tension cells 112
Stress analysis, Photo-elastic 611
Sugar-beet thinning 599
Superconducting motor 202
Supervisory system 604
Surveys
Clutches for control systems. Part 2. Electrically-operated clutches commercially available in the U.K. (Survey 40) by J. C. West 48
Miniature recorders (Survey 42) by C. H. W. Thomesen 307
Pressure transducers (Survey 43) by W. L. Green 637
Process-control computers (Survey 41) by B. Girling 141
Switch based on Hall effect, I.C. 1044
Switch, High-power semiconductor 1002
Switch, Multiplex semiconductor 613
Switches, Photo-electric 683
Switching, Solid-state 616
Symmetrical component analyser 106
Synchro, 'hi-syn' 50
Synchronous switching, Resolver-actuated 130
Synthesis of optimal control systems incorporating a digital computer, Analysis and 1031
System identification/adaptation, Phase-shifted p.r.b.s. from the same source for multivariate 1016
System-response analyser 767
Systems, Advances in the control of 550

T

Tace (turbine automatic control equipment) 598
Tachometer, Phototransistor 115
Tank-level gauging, Digital 867
Technical and biological problems of control 1029
Telemetering instrumentation, Gas 921
Teleprinter 27
Temperature chambers, Control in idealized constant- 877
Temperature controller 116
Temperature controller, Thermistor 1002
Temperature control of a crystal-oscillator oven 420
Temperature controllers 847, 848, 921
Temperature controller with small dead-time and high resolution 786
Temperature/humidity recorder 391
Temperature indicator-controller 1002
Temperature monitoring, Marine 1002
Temperature, Pneumatic indicating controller for 532
Temperature programmers 687
Temperature sensor, Low- 1002
Temperature transmitters 843
Test equipment, Automatic digital 691
Test equipment, Automatic electronic 604
Thermal-survey equipment 469
Thermocouple-pyrometer connexion 531
Thermometer, Electronic 1002
Third-order type-I systems, Synthesis of 316
Thyristor-bridge motor, Transformer commutation for d.c. 1023
Thyristorized starter for wound-rotor induction motor 864
Tide-level detector, Digital capacitive 882
Time-delay relay, Pneumatic 523
Time delay switch 292
Timer/counters 388
Timer, Digital 295
Timers 111, 211, 388, 533, 926
Time totalizer, Electrochemical 613
Titration potentiometer 291
Tin-plate classification 204
Torque feedback, D.C. servo-system with 1037
Torquemeters, Magnetostrictive 62
Torque unit 533
Trace detectors, Fluorescence 531
Train describer 599
Transducers, Pressure 637
Transfer-function analyser 387
Transporter, Work 926
Tuning pneumatic three-term controllers 238

U

U-belt drive 532
U.K.A.C. Control Convention (University of Leicester) 550
U.K.A.C.–I.E.E., I.Mech.E., Inst.M.C.—Industrial measurement techniques for on-line computers 635
Ultrasonics 304, 528

V

Valves
—, bellows-sealed needle 108
—, control (Fishtail) 384
—, directional hydraulic 693
—, four-way linear slide 844
—, marine safety 922
—, parallel slide 528
—, pneumatic bank 384
—, pneumatic sample 921
—, positioning ball 848
—, relief 554
—, solenoid-operated pneumatic 1002
—, thermostatic water 23
Viewpoint
A gap in our industrial defences? by J. Bostock 831
Attracting bright pupils into engineering by Professor E. R. Laithwaite 19
Automation is a philosophy by D. A. Bell 377
Improved inter-disciplinary communication by G. Orloff 287
Labour costs are too low by W. F. S. Woodford 679
Less than a miracle by C. R. Peter 753
Spreading the jam of modern technology by Dr Sydney Jones 201
Technology in industry—its meaning and rewards by F. E. Jones 997
Telemetering and control by Peter J. Mayes 913
The case for the technician engineer by Sir Harold Bishop 517

Where to next? by F. R. Ford 597
Whither control engineering? by Dr J. Rose 101
Viscosity controller 603
Voltage-reference units 847
Voltmeter, Automatic digital 615
Voltmeter, Digital 211, 295, 767
Voltmeter, Summing digital 760

W

Warehousing, Automated 378
Warren Spring Laboratory 289
Water monitor 613
Water purity controller 683
Water-purity monitors 527
Waveform analyser 24
Wave-height analysis 230
Weighing instrumentation 684
Weighing machinery, Automatic 840
Weight-control systems 603
Wiring tester 295
Word generator 215

Z

Zubov's method 471

AUTHOR INDEX

Abrahams, J. R. Review of *Staff titles and job descriptions in commercial data processing* 395
Aleksander, Igor. Review of *Kombinatorische und sequentielle netzwerke* by D. Schulte 395
Alexandrovitz, A. (*see* Emanuel-Eigeles)
Anderton, R. H. Review of *The human organisation—its management and value* by R. Likert 617
Andrew, A. M. *Technical and biological problems of control* 1029
Atkinson, P. *and* Davey, R. L. *A theoretical approach to the tuning of pneumatic three-term controllers* 238
Baldwin, F. H. *Digital tank-level gauging* 867
Bane, W. T. Review of *Systems engineering methods* by Harold Chestnut 301
Barker, H. A. *and* Murray-Smith, D. J. *System sensitivity and adaptivity* 959
Barnett, S. *Algebraic methods in Liapunov theory* 545
Beck, M. S. *and* Wainwright, N. *Direct digital control of chemical processes. Part 5. Control of individual loops* 53
Beck, M. S. (*see* Mylroi)
Beck, M. S. Review of *Computer applications* by Colin I. Barnes 395
Beck, M. S. Review of *Introduction to computer engineering* by B. S. Walker 395
Bell, D. A. *Automation is a philosophy* 377
Bell, D. A. Review of *75 years Brown Boveri* 120
Bell, D. J. Review of *Advances in control systems. Theory and applications. Vol. 5* edited by C. T. Leondes 301
Bellamy, N. W. *and* Hulton, L. J. *Sequential-mode control system for hybrid computation* 243
Bhagwat, P. G. *Transformer commutation for d.c. thyristor-bridge motor* 1023
Bishop, Sir Harold. *The case for the technician engineer* 517
Blackman, P. F. Review of *Modern control systems* by Richard C. Dorf 119
Bostock, J. *A gap in our industrial defences?* 831
Briggs, P. A. N., Clarke, D. W. *and* Hammond, P. H. *Introduction to statistical identification methods in control systems* 233
Calvert, G. *Practical process control using the root locus* 870
—, Part II 954
Carron, Sir William. Review of *Better use of labour in the firm* 301
Channell, J. P. G. *Automation in the cement manufacturing industry* 939
Church, F. *Paper-stock consistency control* 304
Clarke, D. W. (*see* Briggs)
Clarke, D. W. (*see* Williams, B. J.)
Clarke, R. L. *Automatic assembly of rolling bearings* 143
Colvile, R. F. Review of *Marketing planning. Approaches of selected companies* by Ernest C. Miller 120
—, Review of *Organisation for overseas marketing—export handbook No. 3* 395
Cooke, P. Review of *Advanced electronic techniques—proceedings of the second Oxford electronics lecture course* by G. W. A. Dummer 120
—, Review of *Elektronische schalter und kippstufen mit transistoren* by E. Schmitt 301
Davey, R. L. (*see* Atkinson)
Davies, T. W. (*see* Taylor)
Davison, E. J. *The simplification of large linear systems* 418
Demczynski, S. Review of *Computer aided production control* 119
—, *International conference on automation, full employment and a balanced economy, Rome, Italy, 1967* 617
Druce, Gerald. *The electromechanical control of mechanisms* 37
Duckenfield, M. J. *Computer graphics* 861
Edwards, R. *Pulse-rate and pulse-number signals in automatic control* 627
Emanuel-Eigeles, A. *and* Alexandrovitz, A. *Thyristorized starting device for a wound-rotor induction motor* 864
Etzweiler, George A. (*see* Shearer)
Finkelstein, L. Review of *Topology and matrices in the solution of networks* by F. E. Rogers 31
Flavell, M. E. Review of *Electronic computers* by John C. Cluley 302
Ford, F. R. *Where to next?* 597
Garner, K. C. *Improving stepping-motor performance. Part 1* 541
—, *Part 2* 648
—, Review of *Basic analogue computation* by G. R. Peterson 302
George, M. P. *Positional control without carrier voltage or error compensation* 882
Gill, K. F. *and* Schwarzenbach, J. *Design of an optimum relay-type governor for a gas-turbine engine* 322
Girling, B. *Process-control computers* (Survey 41) 141
—, Review of *Geometric programming* by R. J. Duffin, E. L. Peterson and C. M. Zener 120
Goodacre, J. B. *Temperature control of a crystal-oscillator oven* 420
Goodman, L. Landon. Review of *Basic industrial electronics* by A. Hass 395
—, Review of *Human factors problems in changing industrial systems. A.P. Note 4* by D. Whitfield 120
Green, W. L. *Pressure transducers* (Survey 43) 637
Hammond, P. H. (*see* Briggs)
Higham, J. D. *'Single-term' control of first- and second-order processes with dead time* 136
Hill, A. N. *and* Steptoe, B. J. *Servo-system for c.r.t. light-spot positioning* 952
Hinshelwood, J. W. (*see* Seabridge)
Ho, G. E. *and* Walsh, B. W. *Feedforward control of simple process systems* 218
Hulton, L. J. (*see* Bellamy)
Hutchinson, A. W. (*see* Shelton)
Ireland, B. *A note on the root locus of a second-order system* 44
Jani, A. C. *Eddy currents in terms of feedback-system parameters* 793
Jarvis, R. A. *A hybrid computing link in a time-shared environment* 122
—, *Part 2* 251
—, *Phase-shifted pseudorandom binary sequences from the same source for multivariate system identification/adaptation* 1016
Jelonek, Z. J. *Control in some idealized constant-temperature chambers* (Data and method sheet 41) 877
Johnston, C. D. M. Review of *Organization and handling of bibliographic records by computer* edited by N. S. M. Cox and M. W. Grose 302
Jones, F. E. *Technology in industry—its meaning and rewards* 997
Jones, G. *Mechanized discharge and automated sorting and delivery of perishable cargoes* 225
Jones, Sydney. *Spreading the jam of modern technology* 201
Kemeny, G. *and* Olthoff, W. *Temperature controller with small dead-time and high resolution* 786
Konwerski, T. *Synthesis of third-order type-I systems* (Data and method sheet 39) 316
Laithwaite, Professor E. R. *Attracting bright pupils into engineering* 19
Leigh, J. R. *Multivariable control systems* 1026
Levy, N. M. *A hill-climbing servo-mechanism* 770
Lindley, Arnold. Review of *The industrial training yearbook 1967–1968* 301
MacLaren, A. P. *Automatic control in space* 408
MacLellan, G. D. S. Review of *Hydraulic circuits and control systems* by J. R. Fawcett 119
Madan, M. P. S. Review of *Basic principles of data processing* by J. A. Saxon and W. W. Steyer 31
Martin, A. G. Review of *Introduction to quantum mechanics for electrical engineers* by P. A. Lindsay 120
Mayes, Peter J. *Telemetering and control* 913
Murray-Smith, D. J. (*see* Barker)
Mylroi, M. G. *and* Beck, M. S. *Advances in the control of systems* 550
Nutting, D. C. Review of *The impact of computers on management* by Charles A. Myers 28
Olthoff, W. (*see* Kemeny)
Orloff, G. *Improved inter-disciplinary communication* 287
Pandya, R. N. *Three-phase induction motor in a 'bang-bang' servo-mechanism* 702
Parnaby, J. *Automatic control in the lime, cement and connected industries* 937
—, *Computers and systems design. Part 1. Analogue computing techniques* 536
—, *Part 2. Digital computing techniques* 621, 723
Penny, J. E. T. *Impedance measurements of a hydraulic servo-mechanism* 696
Peter, C. R. *Less than a miracle* 753
Petrovic, Radivoj. **Look at the Continent** 64, 327, 714, 775, 1047
Pluck, M. R. *Control of large oil-fired boilers. Part 2* 42
Rankin, J. C. Review of *Report of industrial training act symposium* 119
Rekoff, M. G. jr. *State variables in sampled-data systems. Part 3. Matrix formulation* 57
—, *Part 4. Examples and application* 152
—, *Part 5. Examples and application* 248
—, *Part 6. Appendix* 332
Reid, Karl N., Jr. (*see* Shearer)
Rose, J. *Whither control engineering?* 101
—, Review of *Computer and information sciences—II* edited by Julius T. Tou 302
Rosenbrock, H. H. Review of *Mathematical modelling in chemical engineering* by R. G. E. Franks 28
Schwarzenbach, J. (*see* Gill)
Seabridge, A. G. *and* Hinshelwood, J. W. *Controlling biological assay in medical research* 777
Shearer, J. Lowen, Etzweiler, George A. *and* Reid, Karl N., Jr. **Look at America** 62, 156, 336, 471, 713, 800, 886, 1050
Shelton, R. J. *and* Hutchinson, A. W. *Practical determination of on-line distillation-column dynamics* 398
Shuttleworth, J. E. *Control engineering applications of statistical communication theory* 132
—, *Part 2. Examples and applications* 246
Smith, D. G. *Engineering uses of holography* 1041
Steinbrecher, Oswald. *Decelerating and stopping equipment for cold-rolling reversing mills. Part 1* 707
—, *Part 2. Operating and economic considerations* 797
Steptoe, B. J. (*see* Hill)
Storey, C. Review of *Prediction analysis* by John R. Wolberg 301
Tan, J. S. C. *D.C. servo-system with torque feedback* 1037
Taylor, Denis. *Statistics of counting* 719
—, *Dead-time correction in nucleonic counter systems* 862
—, Review of *Mean rate analysis with the PDP8 computer—A.E.R.E. report No. R5425* by G. C. Best and I. N. Hooton 28
—, Review of *The new materials* by David Fishlock 396
Taylor, D. S. *and* Davies, T. W. *Self-balancing servo-drive system for a five-hole Pitot probe* 312
Thomesen, C. H. W. *Miniature recorders* (Survey 42) 307
Towill, D. R. *Direct evaluation of sensitivity relationships using the coefficient plane* 560
Wainwright, N. (*see* Beck)
Walsh, B. W. (*see* Ho)
Webb, C. R. Review of *Principles of automatic control* by Martin Healey 119
—, Review of *Stability criteria for linear dynamical systems* by Brian Porter 301
Webb, Nick. *Pattern recognition—a light-hearted view* 874
West, J. C. *Clutches for control systems. Part 2. Electrically-operated clutches commercially available in the U.K.* (Survey 40) 48
Whitehead, R. W. *Doubly fed induction motors for low-speed applications* 147
Wilkes, M. V. Review of *Mathematical methods for digital computers* by A. Ralston and H. S. Wilf 120
—, Review of *Titran/360 self instructional manual and text* by C. R. Bauer, A. P. Peluso *and* W. S. S. Worley 000
—, *Computer programming and related mathematics* by Richard V. Andree 28
Williams, B. J. *and* Clarke, D. W. *Plant modelling from p.r.b.s. experiments* 856
—, *Part 2* 947
Williamson, S. E. *Design data to assist the plotting of root loci. Part 1. Root loci of type-0 systems* 404
—, *Part 2. Root loci of type-I systems* 556
—, *Part 3. Root loci of type-II and type-III systems* (Data and method sheet 40) 645
Wilson, D. R. *Analysis and synthesis of optimal control systems incorporating a digital computer* 1031
Withers, R. M. J. Review of *Process control systems* by F. G. Shinskey 119
Wood, G. G. *Alternative methods of computer control* 941
Woodford, W. F. S. *Labour costs are too low* 679
—, Review of *A conceptual framework for management sciences* by M. E. Mundel 396
Young, J. F. *Control possibilities of double-stator squirrel-cage motors* 416
—, *Field control of motors with constant-current armature supply* 35
Young, Peter C. *Process parameter estimation* 931

PRINTED BY THE JOURNAL PRESS, SWAN LANE, EVESHAM, FOR THE PROPRIETORS, MORGAN-GRAMPIAN LTD., 28 ESSEX STREET, STRAND, LONDON, W.C.2.